

REMARKS

Claims 1-20, all the claims pending in the application, stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1-11 stand rejected under 35 U.S.C. §102(b) as being anticipated by Levinson et al. (6,098,408), hereinafter referred to as Levinson. Claims 1-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Levinson or Macris (6,686,532) in view of Geusic et al. (6,496,370), hereinafter referred to as Geusic. Applicants respectfully traverse these rejections based on the following discussion.

A. The Rejection Based on Levinson

The Levinson patent teaches a system for controlling reticle temperature in extreme ultraviolet lithography by providing a cooling source (and control mechanism) that is temporarily coupled to the reticle. The preferred embodiment in Levinson is through thermoelectric cooling. However, Levinson describes a cooling chuck for regulating reticle temperature, while the claimed invention defines a reticle substrate that is, in itself, cooled (and a process flow for fabrication of this substrate using a planarizing layer above the cooling layer). More specifically, independent claim 1 defines that the "substrate, said cooling layer, said planarizing layer, and said mask absorber comprise an integrated structure." This defines the invention's novel self-cooling reticle substrate. To the contrary, Levinson describes a cooling chuck that is only temporarily coupled to the reticle substrate.

While, at the first glance, there may appear to be some similarity between Levinson and the claimed invention, upon closer inspection, Applicants note that Levinson clearly does not describe the claimed device and method that provide a self-cooling substrate. In other words,

claim 1 defines a "mask" as opposed to Levinson, which describes a system for regulating temperature. More specifically, in column 1, lines 35-37, Levinson explains that the back plate 20 of the chuck assembly 28 (Figure 4) includes the thermoelectric coolers 30. This is also clearly shown in Figures 1, 2, and 4 of Levinson. The chuck 28 assembly in Levinson will only be temporarily attached to the reticle, while with the present invention, the substrate itself includes a cooling layer 120, 220, as shown in Applicants' Figures 1 and 2.

Therefore, since Levinson only discloses a cooling chuck that can be connected to a mask and does not disclose a mask that includes a cooling layer, it is Applicants' position that Levinson does not teach or suggest that the "substrate, said cooling layer, said planarizing layer, and said mask absorber comprise an integrated structure," as defined by independent claim 1. Therefore, Applicants submit that independent claim 1 is not anticipated by Levinson and is patentable over the prior art of record. Further, dependent claims 2-11 are similarly patentable, not only by their dependency from patentable independent claim 1, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

B. The Rejection Based on Levinson or Macris and Geusic

As explained above, Levinson only discloses a cooling chuck that can be temporarily connected to a mask. Therefore, as concluded above, it is Applicant's position that Levinson does not teach or suggest the claimed invention as defined by any of the independent claims. More specifically, independent claim 1 defines "a mask absorber above said planarizing layer, wherein said substrate, said cooling layer, said planarizing layer, and said mask absorber comprise an integrated structure." Similarly, independent claim 12 defines "a mask absorber above said substrate, wherein said substrate, said cooling channel, and said mask absorber comprise an integrated structure." Also, independent claim 18 defines "forming a mask absorber above said mask substrate layer, wherein said forming of said substrate, said cooling channel, and said mask absorber forms an integrated structure." This defines the invention's novel self-

cooling reticle substrate that, as described above, is not taught or suggested by Levinson.

Macris is not related to the claimed art field of masks, and there is no explanation or motivation as to why one ordinarily skilled in the art would have applied the teachings of Macris to the field of masks. Further, the independent claims define that the various portions of the mask and the cooling layer or cooling channels form an integrated structure. To the contrary, Macris only discloses a thermoelectric heat sink that can be connected to the heat source. Therefore, the Macris thermoelectric heat sink is truly exterior to the heat source structure to which it is connected, and the heat sink is not integrated with the heat source as the present claims define. Note that the claims define that the cooling channels are actually within the substrate of the mask itself, or that the cooling layer is between the substrate and the planarizing layer of the mask.

In other words, Macris simply describes the formation of a thermoelectric heat sink which can be subsequently connected to the heat source. To the contrary, with the claimed invention, the cooling layer or cooling channels are actually made part of the heat source. For example, claim 1 defines that the cooling layer is between the substrate and the planarizing layer of the mask. This is fundamentally different than what is being described and Macris where a completed heat generating structure is simply connected to a previously formed thermoelectric heat sink (or vice versa).

With the invention, the cooling layer (or cooling channels in independent claims 12 and 18) is actually part of the structure as opposed to something that is attached to the structure (such as the chuck in Levinson or the thermoelectric heat sink and Macris) after the structure is completely formed. Not only does the invention provides superior cooling because the cooling layer/channels are part of the structure, but the structure is also smaller, less-expensive, and easier to manufacture than the systems described in Levinson and Macris which require that two separate devices be manufactured and then connected together.

With respect to the Geusic reference, which is cited merely for teaching the concept of cooling channels, there again is no suggestion as to incorporating such features as an integral part of a mask, as in the claimed invention. Therefore, not only is there no motivation to combine the

references in the manner urged in the Office Action, even if these references are combined, there is still no teaching of the inventive mask structure that includes a cooling layer or cooling channels as an integral part of the structure.

Therefore, it is Applicant's position that the prior art of record does not teach or suggest "a mask absorber above said planarizing layer, wherein said substrate, said cooling layer, said planarizing layer, and said mask absorber comprise an integrated structure," as defined by independent claim 1, and similarly does not teach or suggest "a mask absorber above said substrate, wherein said substrate, said cooling channel, and said mask absorber comprise an integrated structure," as defined by independent claim 12, nor does the prior art teach or suggest "forming a mask absorber above said mask substrate layer, wherein said forming of said substrate, said cooling channel, and said mask absorber forms an integrated structure," as defined by independent claim 18. Therefore, it is Applicant's position that the independent claims in the present application are patentable over the prior art of record. Further, dependent claims 2-11, 13-17, and 19-20 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection.

II. Formal Matters and Conclusion

In view of the foregoing, Applicants submit that claims 1-20, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit
Account Number 09-0456.

Respectfully submitted,

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